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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,731	03/31/2004	Yoram Ofek	OFE 1854	9871

20787 7590 12/14/2010

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EXAMINER	
AYOTUNDE, AYODEJI O	
ART UNIT	PAPER NUMBER
2618	
MAIL DATE	DELIVERY MODE
12/14/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/814,731	OFEK ET AL.	
	Examiner	Art Unit	
	AYODEJI AYOTUNDE	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This is in response to the applicant's communication filed on 12 October 2010, wherein: Claims 1-57 are currently pending. Claims 1, 43 and 54 have been amended. None of the claim(s) has been canceled. None of the claim(s) has been added.

Response to Arguments

Applicant's arguments with respect to claims 1, 43 and 54 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Raleigh et al., US Pat No. 6,101,399.

Re-claim 1, Raleigh teaches a wireless system for transmitting and receiving a plurality of data packets **(fig. 1, col. 1 lines 29-35; this section illustrates a wireless multipath communication channel that arise from reflection of the transmitted signal by dominant reflection surfaces 6, and by minor reflection surfaces 12**

between the base station 2 and the remote mobile user 4.), the system **(fig. 1)** comprising: a plurality of directional antenna sectors self contained at a first location, each of the plurality of directional antenna sectors having a respective associated three dimensional region of space for transmitting and receiving electromagnetic signals **(fig. 2A items 56 58, col. 5 lines 5-8; this section generally discloses an antenna array 56 being employed by a diplexer 58 to be used for both transmit and receive operation by isolating the RF receiver 54 from the RF transmitter 52.)**; at least one receiving controller self contained at the first location **(fig. 2A item 60, col. 5 lines 8-11; this section generally discloses a receive channel beamformer 60 that cooperates with the RF receiver to adaptively optimize the receive antenna beam in order to improve received signal quality.)**; at least one transmitting controller self contained at the first location **(fig. 2A item 64, col. 5 lines 11-14; this section generally discloses a transmit channel beamformer 64 that cooperates with the RF transmitter 52 to adapt the transmit antenna beam to optimize some characteristic of transmission quality.)**; wherein said at least one receiving controller is selectively coupled, one at a time, to each one of the plurality of directional antenna sectors, one at a time, to measure received electromagnetic signal characteristics to determine a best-received electromagnetic signal **(fig. 3 items 60 116, col. 5 lines 43-47; this section generally discloses and shows the downconverted signal energy being digitally sampled and provided to a receive channel weighting module 116 of the receive channel beamformer 60 as well as the weights applied by the receive channel beamformer 60 to each of the M downconverted antenna element output.)**; wherein said at least one of the receiving

controllers is responsive to the measure of the received electromagnetic signal characteristics from each of the plurality of directional antenna sectors to select one of the directional antenna sectors as a selected directional antenna sector, prior to the transmission of at least one data packet **(fig. 3 item 118, col. 5 lines 45-54; this section generally discloses and shows the weights of the complex frequency downconverter are determined by a receiving weight vector adaptation module 118 located in the receive channel beamformer 60, and the receiver weight vector adaptation module 118 determines a receive channel weight vector, Wr, which maximizes the signal quality received over the desired inbound frequency channel.)**; and wherein at least one of said transmitting controllers is selectively coupled to the selected directional antenna sector for transmitting said at least one data packet via the selected directional antenna sector **(fig. 3 items 64 140 150 158, col. 5 line 55 – col. 6 line 33; this section generally discloses and shows a transmit beamformer 64 having a vector channel covariance estimator 140 that yields an estimated receive channel covariance matrix used during the transmit beamforming process, an optimal transmit beam patter weight vector is generated by a transmit channel weight vector adaptation module 150 based on the results of the statistical characterization of the receive channel vector, and the weighting module 158 produce the weighted set of input signals that gets provided to the antenna array 56 for transmission via diplexer 58.)**.

Claims 2-3 have been analyzed and rejected with respect to claim 1 above.

Re-claim 4, Raleigh further teaches wherein a selected one of said at least one receiving controller selects at least one of the directional antenna sectors within an order dependent upon history of the received electromagnetic signal characteristics prior to the transmission of at least one data packet **(fig. 2A item 60, col. 5 lines 8-11; this section generally discloses a receive channel beamformer 60 that cooperates with the RF receiver to adaptively optimize the receive antenna beam in order to improve received signal quality.)**.

Re-claim 5, Raleigh further teaches wherein the plurality of directional antenna sectors are part of at least one of: a mobile device, a laptop computer, a desktop computer, a personal digital assistant (PDA), a cordless phone, a wireless phone, a cellular phone, a 2.5G cellular phone, a 3G device, a 4G device, a 5G device, a multimedia device, a GPS (global positioning system) receiver, an electronic book, electronic paper, an automotive, a boat, a ship, an airplane, a train, a satellite, a hand-held device, a base station, an access point, an access router, a UAV (unmanned aerial vehicle), and a packet switch output **(col. 4 lines 51-54; this section discloses an antenna array 56 (i.e. directional antenna sectors) associated with a base station to produce independent transmit and receive antenna beams for facilitating communication with one or more mobile units.)**.

Re-claim 6, Raleigh further teaches wherein the receiving controller is part of at least one of: a mobile device, a laptop computer, a personal digital assistant, a cordless

phone, a wireless phone, voice-over IP, a RFID (radio frequency identifier), a cellular phone, a 2.5G cellular phone, a 3G device, a 4G device, a 5G device, a multimedia device, a GPS (global positioning system) receiver, an electronic book, electronic paper, and a packet switch **(col. 5 lines 8-9; this section discloses a receive channel beamformer 60 cooperating with the receiver 54 (i.e. these components are part of the base station). A base station is capable of being a 3G and/or 4G device.)**.

Re-claim 7, Raleigh further teaches wherein at least one of the plurality of directional antenna sectors are polarized antennas, and wherein each said polarized antenna sector transmits an electromagnetic signal in a defined polarization **(col. 4 lines 54-57; this section generally discloses an antenna array of a base station that forms propagation channel to a given remote user. It is also inherent that an antenna array (i.e. antenna sectors), associated with a base station, are polarized antennas and often used in directed wireless communications.)**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: **(See MPEP Ch. 2141)**

a. Determining the scope and contents of the prior art;
b. Ascertaining the differences between the prior art and the claims in issue;
c. Resolving the level of ordinary skill in the pertinent art; and
d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raleigh et al., US6,101,399 (hereinafter, "Raleigh"), as applied to claim 1 above respectively and further in view of Silva et al., US2004/0224637 A1 (hereinafter, "Silva")

Re-claim 11, Raleigh teaches all the limitations recited in claim 1. Raleigh fails to teach the remaining recited limitation as shown below. However, Silva teaches wherein selected ones of the directional antenna sectors are steered antennas, wherein the steered antennas receive and transmit electromagnetic signals within a defined region in at least one of: two-dimensional space and three-dimensional space **(par. 0047; this section generally discusses the directed communication beams 214 of antenna array 302 can be directionally controllable, such as steerable in an analog implementation or stepable in a digital implementation.)**. Motivation to combine may be gleaned from the prior are contemplated. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein selected ones of the directional antenna sectors are steered antennas, wherein the steered antennas receive and transmit electromagnetic signals within a defined region in at least one of: two-dimensional space and three-dimensional space in the device of Raleigh because such feature taught by Silva provides that a transmit beam-forming network routes data communication transmissions to the client devices via directed communication beams that are emanated from an antenna assembly, and a receive beam-forming network

receives data communication receptions from the client devices via the directed communication beams **(par. 0008)**.

Re-claim 12, the combination of Raleigh and Silva a whole further teach wherein the steered antenna sectors are moveable by at least one of: a step-motor, an electric motor, an electric field, a magnetic field, and a phase array **(Silva, par. 0047; this section discusses that a directed communication beam 214 can be directionally stepable by the width (e.g., degrees) of the communication beam to "steer" or "aim" addressable data packets when communicating with a client device which generally reads on the step-motor.)**. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein the steered antenna sectors are moveable by at least one of: a step-motor, an electric motor, an electric field, a magnetic field, and a phase array in the device of Raleigh because such feature taught by Silva provides that a transmit beam-forming network routes data communication transmissions to the client devices via directed communication beams that are emanated from an antenna assembly, and a receive beam-forming network receives data communication receptions from the client devices via the directed communication beams **(par. 0008)**.

Re-claim 13, Raleigh teaches all the limitations recited in claim 1. Raleigh fails to teach the remaining recited limitation as shown below. However, Silva teaches wherein the directional antenna sectors are arranged in a predefined pattern; and wherein

the predefined pattern is at least one of: polyhedron, polygon, octahedron, pentagon, cube, pyramid, sectorized cylinder, ball, pentagondodecahedron, and icositetrahedron **(fig. 3 item 300 par. 0044; this section generally discusses and shows communication beam array 300 shown in FIG. 3 is merely exemplary and other communication beam arrays, or patterns, may differ in width, shape, number, angular coverage, azimuth, and so forth. This means that anyone one of the shapes (patterns) could be by original design the followings such as polyhedron, polygon, octahedron, pentagon, cube, pyramid, sectorized cylinder, ball, pentagondodecahedron, and icositetrahedron.)**. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein the directional antenna sectors are arranged in a predefined pattern; and wherein the predefined pattern is at least one of: polyhedron, polygon, octahedron, pentagon, cube, pyramid, sectorized cylinder, ball, pentagondodecahedron, and icositetrahedron in the device of Raleigh because such feature taught by Silva provides that a transmit beam-forming network routes data communication transmissions to the client devices via directed communication beams that are emanated from an antenna assembly, and a receive beam-forming network receives data communication receptions from the client devices via the directed communication beams (**par. 0008**).

Claims 14-16, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raleigh et al., US6,101,399 (hereinafter, "Raleigh"), as applied to claim 1 above respectively and further in view of Katz et al. US6,393,303 B1 (hereinafter, "Katz")

Re-claim 14, Raleigh teaches all the limitations recited in claim 1. Raleigh fails to teach the remaining recited limitation as shown below. However, Katz teaches wherein there is a plurality of receiving controllers, the system further comprising: a receiving switch; and wherein selected ones of the receiving controllers are selectively coupled to selected ones of the directional antenna sectors utilizing the receiving switch **(fig. 2 items 8 14 18 20 21 col. 7 line 55 – col. 8 line 36; this section generally discusses and exhibits a digital signal processor 21 (receiving controllers) connected to a plurality of processors 18 through multiple A/D converters 20 that is coupled to the antenna elements through the butler matrix circuitry 8. It is well known in the art that a receiving switch is incorporated in the butler matrix circuitry to the antenna elements.)**. Motivation to combine may be gleaned from the prior are contemplated. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein there is a plurality of receiving controllers, the system further comprising: a receiving switch; and wherein selected ones of the receiving controllers are selectively coupled to selected ones of the directional antenna sectors utilizing the receiving switch in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claim 15, the combination of Raleigh and Katz as a whole further teach wherein the receiving switch is constructed by utilizing high impedance amplifiers **(Katz, fig. 2 item 16 col. 8 lines 20-23; this section generally discusses and shows that each**

output 14a-h of the Butler matrix circuitry 8 is connected to the input of a respective amplifier 16 which amplifies the received signal and that one amplifier 16 is provided for each output 14a-h of the Butler matrix circuitry 8. It is commonly well known in the art of practice that amplifiers 16 are high impedance amplifiers in a base transceiver station 4 of figure 2.). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein the receiving switch is constructed by utilizing high impedance amplifiers in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claim 16, the combination of Raleigh and Katz as a whole further teach a plurality of receiver radio frequencies devices (RRFs) **(Katz, fig. 2 item 21; this drawing shows a digital signal processor 21 of a BTS (base transceiver station) 4 having a plurality of A/D converters 20. It is commonly well known that a BTS 4 will have plurality of receivers with a digital signal processor 21 and a plurality of A/D converters 20.)**; wherein the receiving switch has N inputs and R outputs **(Katz, fig. 2 item 16; this drawing shows multiple amplifiers 16 (receiving switch) having its own input and output in a BTS 4.)**; wherein the N inputs are selectively connected to the directional antenna sectors **(Katz, fig. 2 item 14a–h; this drawing shows eight inputs 14a-h (N inputs) being connected to the antenna elements (directional antenna sectors) through butler matrix circuitry 8.)**; and wherein the R outputs are selectively connected to selected ones of the plurality of the RRFs **(Katz, fig. 2 item**

19a–h; this drawing shows inputs 19a-h (R outputs) being connected to the digital signal processor for further processing received signals in a plurality of radio receivers.). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of receiver radio frequencies devices (RRFs); wherein the receiving switch has N inputs and R outputs; wherein the N inputs are selectively connected to the directional antenna sectors, and wherein the R outputs are selectively connected to selected ones of the plurality of the RRFs in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claim 18, Raleigh teaches all the limitations recited in claim 1. Raleigh fails to teach the remaining recited limitation as shown below. However, Katz teaches wherein there is a plurality of the transmitting controllers, the system further comprising: a transmitting switch; and wherein selected ones of the transmitting controllers are selectively coupled to at least one of the directional antenna sectors utilizing the transmitting switch **(Katz, fig. 2 items 8 10a-h 22 21 24a-h col. 7 line 55 – col. 8 line 36; this section generally discusses and exhibits a digital signal processor 21 (transmitting controllers) connected to a plurality of processors 24 through multiple D/A converters 22 that is coupled to the antenna elements through the butler matrix circuitry 8. It is well known in the art that a transmitting switch is incorporated in the butler matrix circuitry to the antenna elements.)**. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein

there is a plurality of the transmitting controllers, the system further comprising: a transmitting switch; and wherein selected ones of the transmitting controllers are selectively coupled to at least one of the directional antenna sectors utilizing the transmitting switch in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claim 19, the combination of Raleigh and Katz as a whole further teach wherein the transmitting switch is comprised of high impedance amplifiers **(Katz, fig. 2 item 26 col. 8 lines 49-51; this section generally discusses and shows resulting signal is then amplified by an amplifier 26 and passed to the respective input 10a-h of the Butler matrix circuitry 8. It is commonly well known in the art of practice that amplifiers 26 are high impedance amplifiers in a base transceiver station 4 of figure 2.)**. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include wherein the transmitting switch is comprised of high impedance amplifiers in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claim 20, the combination of Raleigh and Katz as a whole further teach a plurality of transmitter radio frequencies devices (TRFs) **(Katz, fig. 2 item 21; this drawing shows a digital signal processor 21 of a BTS (base transceiver station) 4**

having a plurality of D/A converters 22. It is commonly well known that a BTS 4 will have plurality of transmitters with a digital signal processor 21 and a plurality of D/A converters 22.); wherein the transmitting switch has T inputs and N outputs **(Katz, fig. 2 item 16; this drawing shows multiple amplifiers 26 (transmitting switch) having its own input and output in a BTS 4.)**; wherein the N outputs are selectively connected to the directional antenna sectors **(Katz, fig. 2 item 14a–h; this drawing shows eight outputs 10a-h (N outputs) being connected to the antenna elements (directional antenna sectors) through butler matrix circuitry 8.)**, and wherein the T inputs are connected to selected ones of the plurality of the TRFs **(Katz, fig. 2 item 19a–h; this drawing shows inputs 10a-h (T inputs) being connected to the digital signal processor for further processing transmitted signals in a plurality of radio transmitters.)**. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of transmitter radio frequencies devices (TRFs); wherein the transmitting switch has T inputs and N outputs; wherein the N outputs are selectively connected to the directional antenna sectors, and wherein the T inputs are connected to selected ones of the plurality of the TRFs in the device of Raleigh because such feature taught by Katz provide an improved method and apparatus for directional radio communication **(col. 2 lines 51-53)**.

Re-claims 8-10, 17, 21-42 and 52, Raleigh in combination of Silva and Katz did not explicitly disclose all of the claimed limitations. However, the examiner takes official notice that these limitations are well known in the art and it would have been

obvious to one of ordinary skill in the art to have those limitations in order to route data communication transmissions to the client devices via directed communication beams that are emanated from an antenna assembly, and a receive beam-forming network receives data communication receptions from the client devices via the directed communication beams **(par. 0008)** as noted in Silva and to provide a radiation beam in a plurality of beam directions, wherein each of the beam directions is individually selectable as well as the information may be used to determine the relative power levels and may be used to determine the principal direction as noted in Katz **(col. 5 lines 42-59)**.

Claims 43-51, 53-57 are rejected as a method as applied to claims 1-42 and 52 above because the scope and content of the recited limitations are substantially the same.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AYODEJI AYOTUNDE whose telephone number is (571) 270-7983. The examiner can normally be reached on Monday through Thursday, 7am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pan Yuwen can be reached on 571-272-7855. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AYODEJI AYOTUNDE/
Examiner, Art Unit 2618

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